US009762636B2

(12) **United States Patent**
**Price**

(10) **Patent No.: US 9,762,636 B2**
(45) **Date of Patent: Sep. 12, 2017**

(54) **STREAMING MEDIA DELIVERY SYSTEM**

(71) Applicant: **WAG ACQUISITION, L.L.C.**, Flanders, NJ (US)

(72) Inventor: **Harold Edward Price**, Bethel Park, PA (US)

(73) Assignee: **WAG ACQUISITION, L.L.C.**, Flanders, NJ (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/283,544**

(22) Filed: **Oct. 3, 2016**

(65) **Prior Publication Data**

US 2017/0026434 A1 Jan. 26, 2017

**Related U.S. Application Data**

(63) Continuation of application No. 13/815,040, filed on Jan. 25, 2013, which is a continuation of application
(Continued)

(51) **Int. Cl.**
***G06F 15/16*** (2006.01)
***H04L 29/06*** (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC .... ***H04L 65/4076*** (2013.01); ***H04L 29/06027*** (2013.01); ***H04L 29/06455*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC ..... H04L 65/80; H04L 65/4076; H04L 49/90; H04L 49/901; H04L 49/9084; H04N 21/23406; H04N 21/23805; H04N 21/2407
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,001,690 A 1/1977 Mack et al.
4,027,337 A 5/1977 de Loye et al.
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2247588 1/2004
EP 0614317 9/1994
(Continued)

OTHER PUBLICATIONS

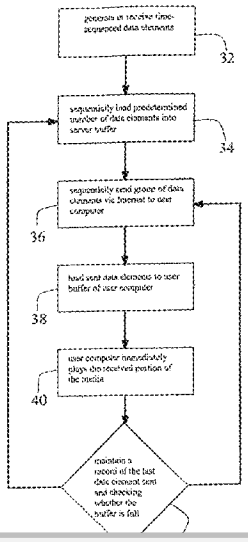
IPR2015-01035 Decision Denying Institution, dated Oct. 23, 2015.
(Continued)

*Primary Examiner* — Joseph E Avellino
*Assistant Examiner* — Marshall McLeod
(74) *Attorney, Agent, or Firm* — Ernest D. Buff; Ernest D. Buff & Associates, LLC

(57) **ABSTRACT**

Streaming media, such as audio or video files, is sent via the Internet. The media are immediately played on a user's computer. Audio/video data is transmitted from the server under control of a transport mechanism. A server buffer is prefilled with a predetermined amount of the audio/video data. When the transport mechanism causes data to be sent to the user's computer, it is sent more rapidly than it is played out by the user system. The audio/video data in the user buffer accumulates; and interruptions in playback as well as temporary modem delays are avoided.

**12 Claims, 3 Drawing Sheets**



**Related U.S. Application Data**

No. 13/385,375, filed on Feb. 16, 2012, now Pat. No. 8,364,839, which is a continuation of application No. 12/800,177, filed on May 10, 2010, now Pat. No. 8,185,611, which is a continuation of application No. 10/893,814, filed on Jul. 19, 2004, now Pat. No. 7,716,358, which is a continuation-in-part of application No. 09/819,337, filed on Mar. 28, 2001, now Pat. No. 6,766,376.

(60) Provisional application No. 60/231,997, filed on Sep. 12, 2000.

(51) **Int. Cl.**

| | |
|---|---|
| ***H04L 12/861*** | (2013.01) |
| ***H04L 12/879*** | (2013.01) |
| ***H04N 21/234*** | (2011.01) |
| ***H04N 21/238*** | (2011.01) |
| ***H04N 21/24*** | (2011.01) |
| ***H04N 21/44*** | (2011.01) |
| ***H04N 21/61*** | (2011.01) |
| ***H04N 21/647*** | (2011.01) |

(52) **U.S. Cl.**

CPC ..... ***H04L 49/90*** (2013.01); ***H04L 49/901*** (2013.01); ***H04L 49/9084*** (2013.01); ***H04L 65/4084*** (2013.01); ***H04L 65/80*** (2013.01); ***H04L 69/16*** (2013.01); ***H04N 21/23406*** (2013.01); ***H04N 21/23805*** (2013.01); ***H04N 21/2407*** (2013.01); ***H04N 21/44004*** (2013.01); ***H04N 21/6125*** (2013.01); ***H04N 21/64776*** (2013.01)

(58) **Field of Classification Search**

USPC ..... 709/203, 204, 217, 219, 223

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|---|---|---|---|---|
| 4,051,530 | A | | 9/1977 | Kuroda et al. |
| 4,606,044 | A | | 8/1986 | Kudo |
| 4,630,196 | A | | 12/1986 | Bednar, Jr. et al. |
| 4,729,020 | A | | 3/1988 | Schaphorst et al. |
| 4,833,535 | A | | 5/1989 | Ozeki et al. |
| 4,839,891 | A | | 6/1989 | Kobayashi et al. |
| 4,963,995 | A | | 10/1990 | Lang |
| 5,025,457 | A | | 6/1991 | Ahmed |
| 5,029,164 | A | | 7/1991 | Goldstein et al. |
| 5,057,932 | A | | 10/1991 | Lang |
| 5,065,396 | A | | 11/1991 | Castellano et al. |
| 5,126,845 | A | | 6/1992 | Yamashita |
| 5,136,655 | A | | 8/1992 | Bronson |
| 5,164,839 | A | | 11/1992 | Lang |
| 5,185,795 | A | | 2/1993 | Bright |
| 5,202,961 | A | | 4/1993 | Mills et al. |
| 5,208,810 | A | | 5/1993 | Park |
| 5,237,156 | A | | 8/1993 | Konishi et al. |
| 5,262,875 | A | | 11/1993 | Mincer et al. |
| 5,319,638 | A | | 6/1994 | Lin |
| 5,361,259 | A | | 11/1994 | Hunt et al. |
| 5,404,446 | A | | 4/1995 | Bowater et al. |
| 5,414,455 | A | * | 5/1995 | Hooper ..... H04N 7/17318 348/E7.071 |
| 5,428,774 | A | | 6/1995 | Takahashi et al. |
| 5,434,678 | A | | 7/1995 | Abecassis |
| 5,434,860 | A | | 7/1995 | Riddle |
| 5,440,334 | A | | 8/1995 | Walters et al. |
| 5,446,734 | A | | 8/1995 | Goldstein |
| 5,457,687 | A | | 10/1995 | Newman |
| 5,491,565 | A | | 2/1996 | Naper |
| 5,491,801 | A | | 2/1996 | Jain et al. |
| 5,493,514 | A | | 2/1996 | Keith et al. |
| 5,497,404 | A | | 3/1996 | Grover et al. |
| 5,515,511 | A | | 5/1996 | Nguyen et al. |
| 5,517,672 | A | | 5/1996 | Reussner et al. |
| 5,521,630 | A | | 5/1996 | Chen et al. |
| 5,526,353 | A | | 6/1996 | Henley et al. |
| 5,533,021 | A | | 7/1996 | Branstad et al. |
| 5,541,852 | A | | 7/1996 | Eyuboglu et al. |
| 5,541,919 | A | | 7/1996 | Yong et al. |
| 5,544,170 | A | | 8/1996 | Kasahara |
| 5,550,982 | A | | 8/1996 | Long et al. |
| 5,561,637 | A | | 10/1996 | Dan et al. |
| 5,561,670 | A | | 10/1996 | Hoffert et al. |
| 5,566,175 | A | | 10/1996 | Davis |
| 5,574,934 | A | | 11/1996 | Mirashrafi et al. |
| 5,579,239 | A | | 11/1996 | Freeman et al. |
| 5,583,561 | A | | 12/1996 | Baker et al. |
| 5,583,563 | A | | 12/1996 | Wanderscheid et al. |
| 5,583,859 | A | | 12/1996 | Feldmeier |
| 5,602,831 | A | | 2/1997 | Gaskill |
| 5,610,841 | A | | 3/1997 | Tanaka et al. |
| 5,613,032 | A | | 3/1997 | Cruz et al. |
| 5,619,995 | A | | 4/1997 | Lobodzinski |
| 5,621,660 | A | | 4/1997 | Chaddha et al. |
| 5,623,490 | A | | 4/1997 | Richter et al. |
| 5,627,936 | A | | 5/1997 | Prasad et al. |
| 5,633,859 | A | | 5/1997 | Jain et al. |
| 5,644,355 | A | | 7/1997 | Koz et al. |
| 5,661,665 | A | | 8/1997 | Glass et al. |
| 5,663,951 | A | | 9/1997 | Danneels et al. |
| 5,664,044 | A | | 9/1997 | Ware |
| 5,664,116 | A | | 9/1997 | Gaytan et al. |
| 5,666,161 | A | | 9/1997 | Kohiyama et al. |
| 5,668,948 | A | | 9/1997 | Balknap et al. |
| 5,710,970 | A | | 1/1998 | Walters et al. |
| 5,719,786 | A | | 2/1998 | Nelson et al. |
| 5,721,815 | A | | 2/1998 | Ottesen |
| 5,721,878 | A | | 2/1998 | Ottesen et al. |
| 5,734,119 | A | | 3/1998 | France et al. |
| 5,737,536 | A | | 4/1998 | Herrmann et al. |
| 5,751,883 | A | | 5/1998 | Ottesen |
| 5,751,951 | A | | 5/1998 | Osborne et al. |
| 5,751,968 | A | | 5/1998 | Cohen |
| 5,758,087 | A | | 5/1998 | Aaker et al. |
| 5,761,417 | A | | 6/1998 | Henley |
| 5,768,527 | A | | 6/1998 | Zhu et al. |
| 5,778,374 | A | | 7/1998 | Dang et al. |
| 5,793,980 | A | | 8/1998 | Glaser et al. |
| 5,805,823 | A | | 9/1998 | Seitz |
| 5,809,239 | A | | 9/1998 | Dan et al. |
| 5,815,662 | A | | 9/1998 | Ong |
| 5,819,160 | A | | 10/1998 | Foladare et al. |
| 5,821,986 | A | | 10/1998 | Yuan et al. |
| 5,822,524 | A | * | 10/1998 | Chen ..... H04L 1/1848 348/E7.073 |
| 5,822,537 | A | | 10/1998 | Katseffet et al. |
| 5,828,370 | A | | 10/1998 | Moeller et al. |
| 5,835,495 | A | | 11/1998 | Ferriere |
| 5,835,667 | A | | 11/1998 | Wactlar et al. |
| 5,841,432 | A | | 11/1998 | Carmel et al. |
| 5,841,979 | A | | 11/1998 | Schulhof et al. |
| 5,850,481 | A | | 12/1998 | Rhoads |
| 5,864,682 | A | | 1/1999 | Porter et al. |
| 5,867,230 | A | | 2/1999 | Wang et al. |
| 5,867,652 | A | | 2/1999 | Hurvig |
| 5,874,986 | A | | 2/1999 | Gibbon et al. |
| 5,875,305 | A | | 2/1999 | Winter et al. |
| 5,881,245 | A | | 3/1999 | Thompson |
| 5,892,915 | A | | 4/1999 | Duso et al. |
| 5,910,876 | A | | 6/1999 | Sharma et al. |
| 5,918,002 | A | | 6/1999 | Klemets |
| 5,922,048 | A | | 7/1999 | Emura |
| 5,923,655 | A | | 7/1999 | Veschi et al. |
| 5,928,327 | A | | 7/1999 | Wang et al. |
| 5,928,330 | A | | 7/1999 | Goetz et al. |

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,938,734 A 8/1999 Yao et al.
5,953,506 A 9/1999 Kalra et al.
5,956,716 A 9/1999 Kenner et al.
5,963,202 A 10/1999 Polish
5,968,120 A 10/1999 Guedalia
5,969,763 A 10/1999 Sakamoto
5,974,503 A 10/1999 Venkatesh et al.
5,978,567 A 11/1999 Rebane et al.
5,987,510 A 11/1999 Imai et al.
5,995,091 A 11/1999 Near et al.
5,995,705 A 11/1999 Lang
5,996,015 A 11/1999 Day et al.
5,999,525 A 12/1999 Krlshnaswamy et al.
6,002,720 A 12/1999 Yurt et al.
6,005,600 A 12/1999 Hill
6,011,590 A 1/2000 Saukkonen
6,014,693 A 1/2000 Ito et al.
6,014,694 A 1/2000 Aharoni et al.
6,014,706 A 1/2000 Cannon et al.
6,018,359 A 1/2000 Kermode et al.
6,029,194 A 2/2000 Tilt
6,032,180 A 2/2000 Nishikawa
6,032,189 A 2/2000 Jinzenji et al.
6,032,193 A 2/2000 Sullivan
6,032,197 A 2/2000 Birdwell et al.
6,037,983 A 3/2000 Au et al.
6,040,866 A 3/2000 Chen
6,047,317 A 4/2000 Bisdikian et al.
6,047,356 A 4/2000 Anderson et al.
6,057,832 A 5/2000 Lev et al.
6,061,731 A 5/2000 Blakeslee
6,061,732 A 5/2000 Korst et al.
6,065,050 A 5/2000 DeMoney
6,067,303 A 5/2000 Aaker et al.
6,085,221 A 7/2000 Graf
6,085,252 A 7/2000 Zhu et al.
6,097,422 A 8/2000 Aref et al.
6,138,147 A 10/2000 Weaver et al.
6,151,632 A 11/2000 Chaddha et al.
6,151,634 A 11/2000 Glaser et al.
6,161,137 A 12/2000 Ogdon et al.
6,173,328 B1 1/2001 Sato
6,173,340 B1 1/2001 Gready et al.
6,181,364 B1 1/2001 Ford
6,192,032 B1 2/2001 Izquierdo
6,205,525 B1 3/2001 Korst
6,212,206 B1 4/2001 Ketcham
6,233,226 B1 5/2001 Gringeri et al.
6,249,551 B1 6/2001 Yamaguchi
6,249,810 B1 6/2001 Kiraly
6,263,001 B1 7/2001 Banks
6,269,394 B1 7/2001 Kenner et al.
6,275,536 B1 8/2001 Chen et al.
6,279,040 B1 8/2001 Ma et al.
6,292,834 B1 9/2001 Ravi et al.
6,301,258 B1 10/2001 Katseff et al.
6,317,416 B1 11/2001 Giroux et al.
6,317,795 B1 11/2001 Malkin et al.
6,321,269 B1 11/2001 Walker
6,329,986 B1 12/2001 Cheng
6,336,143 B1 1/2002 Diedrich et al.
6,347,094 B1 2/2002 Gopalakrishnan
6,370,272 B1 4/2002 Shimizu
6,377,931 B1 4/2002 Shlomot
6,377,995 B2 4/2002 Agraharam et al.
6,385,596 B1 5/2002 Wiser
6,385,673 B1 5/2002 DeMoney
6,389,473 B1 5/2002 Carmel et al.
6,396,907 B1 5/2002 Didcock
6,397,251 B1 5/2002 Graf
6,397,259 B1 5/2002 Lincke
6,405,256 B1 6/2002 Lin et al.
6,408,128 B1 6/2002 Abecassis
6,438,630 B1 8/2002 DeMoney
6,449,719 B1 9/2002 Baker
6,452,943 B1 9/2002 Furuya
6,487,663 B1 11/2002 Jaisimha et al.
6,502,139 B1 12/2002 Birk et al.
6,502,194 B1 12/2002 Berman et al.
6,535,920 B1 3/2003 Parry et al.
6,536,043 B1 3/2003 Guedalia
6,549,942 B1 4/2003 Janky et al.
6,557,031 B1 4/2003 Mimura et al.
6,574,218 B1 6/2003 Cooklev
6,588,015 B1 7/2003 Eyer et al.
6,594,699 B1 7/2003 Sahai et al.
6,598,228 B2 7/2003 Hejna, Jr.
6,621,870 B1 9/2003 Gordon et al.
6,625,656 B2 9/2003 Goldhor et al.
6,625,750 B1 9/2003 Duso et al.
6,637,031 B1 10/2003 Chou
6,665,751 B1 12/2003 Chen et al.
6,675,241 B1 1/2004 Hunter
6,700,893 B1 3/2004 Radha et al.
6,708,213 B1 3/2004 Bommaiah et al.
6,711,741 B2 3/2004 Yeo
6,715,007 B1 3/2004 Williams et al.
6,715,126 B1 3/2004 Chang et al.
6,728,753 B1 4/2004 Parasnis
6,738,380 B1 5/2004 Imai et al.
6,741,290 B1 5/2004 Wells
6,757,273 B1 6/2004 Hsu et al.
6,757,796 B1 6/2004 Hofmann
6,763,178 B1 7/2004 Suzuki et al.
6,763,392 B1 7/2004 del Val
6,778,499 B1 8/2004 Senarath et al.
6,788,686 B1 9/2004 Khotimsky et al.
6,792,468 B1 9/2004 Bloch et al.
6,806,909 B1 10/2004 Radha et al.
6,829,368 B2 12/2004 Meyer et al.
6,831,892 B2 12/2004 Robinett et al.
6,845,398 B1 1/2005 Galensky et al.
6,847,618 B2 1/2005 Laursen et al.
6,850,965 B2 2/2005 Allen
6,859,557 B1 2/2005 Uyttendaele et al.
6,879,559 B1 4/2005 Blackmon et al.
6,879,634 B1 4/2005 Oz et al.
6,888,848 B2 5/2005 Beshai et al.
6,889,257 B1 5/2005 Patel
6,907,481 B2 6/2005 Kovacevic
6,925,495 B2 8/2005 Hegde et al.
6,938,047 B2 8/2005 Kryeziu
6,978,306 B2 12/2005 Miller et al.
6,981,050 B1 * 12/2005 Tobias ..... H04L 29/06027 348/E7.071
6,985,932 B1 1/2006 Glaser et al.
6,988,144 B1 1/2006 Luken et al.
6,990,497 B2 1/2006 O'Rourke et al.
6,992,983 B1 1/2006 Chatterjee
6,993,787 B1 1/2006 Kamel et al.
7,016,970 B2 3/2006 Harumoto et al.
7,020,710 B2 3/2006 Weber et al.
7,035,287 B2 4/2006 Tourunen et al.
7,039,784 B1 5/2006 Chen et al.
7,046,672 B2 5/2006 Liao et al.
7,054,500 B1 5/2006 Lillevold
7,058,721 B1 6/2006 Ellison et al.
7,058,728 B1 6/2006 Eklund
7,061,936 B2 6/2006 Yoshimura et al.
7,065,342 B1 6/2006 Rolf
7,085,842 B2 8/2006 Reid et al.
7,111,058 B1 9/2006 Nguyen et al.
7,111,162 B1 9/2006 Bagepalli et al.
7,111,316 B1 9/2006 Zahorjan et al.
7,113,983 B1 9/2006 Terada et al.
7,127,735 B1 10/2006 Lee et al.
7,136,377 B1 11/2006 Tweedly et al.
7,143,177 B1 11/2006 Johnson et al.
7,149,811 B2 12/2006 Wise et al.
7,154,895 B1 12/2006 Bornemisza et al.

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|---|---|---|---|---|
| 7,167,560 | B2 | 1/2007 | Yu | |
| 7,170,856 | B1 | 1/2007 | Ho et al. | |
| 7,187,947 | B1 | 3/2007 | White | |
| 7,209,437 | B1 * | 4/2007 | Hodgkinson | H04L 29/06 370/230 |
| 7,212,574 | B2 | 5/2007 | Abrams, Jr. et al. | |
| 7,224,703 | B2 | 5/2007 | Antal et al. | |
| 7,237,254 | B1 * | 6/2007 | Omoigui | H04N 7/17318 348/E7.071 |
| 7,239,703 | B2 | 7/2007 | Higurashi et al. | |
| 7,249,264 | B2 | 7/2007 | Belknap et al. | |
| 7,260,564 | B1 | 8/2007 | Lynn et al. | |
| 7,266,118 | B2 | 9/2007 | Ido et al. | |
| 7,272,298 | B1 | 9/2007 | Lang et al. | |
| 7,272,658 | B1 | 9/2007 | Edelman et al. | |
| 7,287,083 | B1 | 10/2007 | Nay et al. | |
| 7,298,849 | B2 | 11/2007 | Graunke | |
| 7,302,396 | B1 | 11/2007 | Cooke | |
| 7,310,678 | B2 | 12/2007 | Gunaseelan et al. | |
| 7,318,017 | B2 | 1/2008 | Swoboda | |
| 7,330,902 | B1 | 2/2008 | Bergenwall et al. | |
| 7,334,016 | B2 | 2/2008 | Fishhaut et al. | |
| 7,334,044 | B1 | 2/2008 | Allen | |
| 7,346,698 | B2 | 3/2008 | Hannaway | |
| 7,349,663 | B1 | 3/2008 | Joseph | |
| 7,373,413 | B1 | 5/2008 | Nguyen et al. | |
| 7,376,710 | B1 | 5/2008 | Cromwell et al. | |
| 7,398,312 | B1 | 7/2008 | Guo et al. | |
| 7,406,176 | B2 | 7/2008 | Zhu et al. | |
| 7,424,730 | B2 | 9/2008 | Chou | |
| 7,434,052 | B1 | 10/2008 | Rump | |
| 7,448,062 | B1 | 11/2008 | Bloch et al. | |
| 7,471,834 | B2 | 12/2008 | Sull et al. | |
| 7,478,164 | B1 | 1/2009 | Lango et al. | |
| 7,496,676 | B2 | 2/2009 | Kryeziu | |
| 7,499,545 | B1 | 3/2009 | Bagshaw | |
| 7,561,602 | B1 | 7/2009 | Nakabayashi | |
| 7,570,766 | B2 | 8/2009 | Mangold et al. | |
| 7,583,695 | B2 | 9/2009 | Vimpari et al. | |
| 7,584,291 | B2 | 9/2009 | McDowall et al. | |
| 7,587,509 | B1 | 9/2009 | Edelman et al. | |
| 7,590,237 | B2 | 9/2009 | Krause et al. | |
| 7,590,656 | B2 | 9/2009 | Plastina et al. | |
| 7,594,110 | B2 | 9/2009 | Carr | |
| 7,647,297 | B2 | 1/2010 | LaChapelle et al. | |
| 7,681,227 | B2 | 3/2010 | Zwart et al. | |
| 7,689,510 | B2 | 3/2010 | Lamkin et al. | |
| 7,769,168 | B2 | 8/2010 | Zhu et al. | |
| 7,818,444 | B2 | 10/2010 | Brueck et al. | |
| 7,836,124 | B2 | 11/2010 | Saxena et al. | |
| 7,839,998 | B2 | 11/2010 | Candelore et al. | |
| 7,848,520 | B2 | 12/2010 | Candelore et al. | |
| 7,890,631 | B2 | 2/2011 | Allen | |
| 7,913,282 | B2 | 3/2011 | Ishikawa et al. | |
| 7,917,557 | B2 | 3/2011 | Shteyn et al. | |
| 7,975,060 | B2 | 7/2011 | Monro | |
| 7,975,280 | B2 | 7/2011 | Bertram | |
| 8,156,236 | B2 | 4/2012 | Costanzo et al. | |
| 8,191,097 | B1 | 5/2012 | Armstrong et al. | |
| 2001/0047377 | A1 | 11/2001 | Sincaglia et al. | |
| 2002/0007418 | A1 | 1/2002 | Hegde et al. | |
| 2002/0013948 | A1 | 1/2002 | Aguayo, Jr. et al. | |
| 2002/0021761 | A1 | 2/2002 | Zhang et al. | |
| 2002/0023165 | A1 | 2/2002 | Lahr | |
| 2002/0025045 | A1 | 2/2002 | Raike | |
| 2002/0029166 | A1 | 3/2002 | Jacobs et al. | |
| 2002/0052967 | A1 | 5/2002 | Goldhor et al. | |
| 2002/0069218 | A1 | 6/2002 | Sull et al. | |
| 2002/0078174 | A1 | 6/2002 | Sim et al. | |
| 2002/0083182 | A1 | 6/2002 | Alvarado et al. | |
| 2002/0120675 | A1 | 8/2002 | Everett et al. | |
| 2002/0131443 | A1 | 9/2002 | Robinett | |
| 2002/0147634 | A1 | 10/2002 | Jacoby et al. | |
| 2003/0018978 | A1 | 1/2003 | Singal et al. | |
| 2003/0061305 | A1 | 3/2003 | Copley et al. | |
| 2003/0068046 | A1 | 4/2003 | Lindqvist et al. | |
| 2003/0093790 | A1 | 5/2003 | Logan et al. | |
| 2003/0186645 | A1 | 10/2003 | Mori | |
| 2004/0049793 | A1 | 3/2004 | Chou | |
| 2004/0078812 | A1 | 4/2004 | Calvert | |
| 2004/0086120 | A1 | 5/2004 | Akins, III et al. | |
| 2004/0123725 | A1 | 7/2004 | Kim | |
| 2004/0131340 | A1 | 7/2004 | Antoun et al. | |
| 2004/0162910 | A1 | 8/2004 | Kryeziu | |
| 2004/0186733 | A1 | 9/2004 | Loomis et al. | |
| 2004/0231004 | A1 | 11/2004 | Seo | |
| 2004/0260835 | A1 | 12/2004 | Welk et al. | |
| 2005/0005025 | A1 | 1/2005 | Harville et al. | |
| 2005/0080876 | A1 | 4/2005 | Peiffer et al. | |
| 2005/0108320 | A1 | 5/2005 | Lord et al. | |
| 2005/0188007 | A1 | 8/2005 | Warner et al. | |
| 2005/0190915 | A1 | 9/2005 | Pare et al. | |
| 2005/0203917 | A1 | 9/2005 | Freeberg et al. | |
| 2005/0251832 | A1 | 11/2005 | Chiueh | |
| 2005/0262251 | A1 | 11/2005 | Klemets et al. | |
| 2006/0095472 | A1 | 5/2006 | Krikorian et al. | |
| 2006/0136875 | A1 | 6/2006 | Thorpe | |
| 2006/0143667 | A1 | 6/2006 | Kurosawa | |
| 2006/0153537 | A1 | 7/2006 | Kaneko et al. | |
| 2006/0174134 | A1 | 8/2006 | Taylor | |
| 2006/0195886 | A1 | 8/2006 | Ashley | |
| 2007/0005428 | A1 | 1/2007 | Jacobs et al. | |
| 2007/0005795 | A1 | 1/2007 | Gonzalez | |
| 2007/0016865 | A1 | 1/2007 | Johnson et al. | |
| 2007/0038728 | A1 | 2/2007 | Jacobs et al. | |
| 2007/0079327 | A1 | 4/2007 | Khoo et al. | |
| 2007/0088804 | A1 | 4/2007 | Qureshey et al. | |
| 2007/0226365 | A1 | 9/2007 | Hildreth et al. | |
| 2007/0233784 | A1 | 10/2007 | O'Rourke et al. | |
| 2007/0274672 | A1 | 11/2007 | Itoi | |
| 2008/0059532 | A1 | 3/2008 | Kazmi et al. | |
| 2008/0133701 | A1 | 6/2008 | Kazmi et al. | |
| 2008/0195743 | A1 | 8/2008 | Brueck et al. | |

FOREIGN PATENT DOCUMENTS

| | | | |
|---|---|---|---|
| EP | 0680185 | | 11/1995 |
| EP | 0720374 | | 7/1996 |
| EP | 0762300 | | 3/1997 |
| EP | 0817017 | | 1/1998 |
| EP | 820204 | A2 | 1/1998 |
| EP | 0827336 | | 3/1998 |
| EP | 0859535 | | 8/1998 |
| EP | 0895420 | | 2/1999 |
| EP | 0984584 | A1 | 3/2000 |
| EP | 1395005 | | 3/2004 |
| EP | 1418756 | | 5/2004 |
| EP | 1427218 | | 6/2004 |
| EP | 1113642 | | 7/2004 |
| EP | 1437866 | | 7/2004 |
| EP | 1487147 | | 12/2006 |
| FR | 2732180 | | 9/1996 |
| JP | H09298734 | | 11/1997 |
| JP | H10108157 | | 4/1998 |
| JP | H10336626 | | 12/1998 |
| JP | 11184780 | | 7/1999 |
| JP | H11184780 | | 7/1999 |
| JP | H11187367 | | 7/1999 |
| JP | H11295589 | | 10/1999 |
| JP | 20-00151595 | | 5/2000 |
| JP | 20-00165844 | | 6/2000 |
| JP | 20-00172599 | | 6/2000 |
| JP | 20-00228669 | | 8/2000 |
| JP | 20-03163916 | | 6/2003 |
| JP | 2003179906 | | 6/2003 |
| KR | 100244854 | | 2/2000 |
| KR | 100253230 | | 4/2000 |
| WO | WO-9712447 | | 4/1997 |
| WO | WO-9717775 | | 5/1997 |
| WO | WO-9717776 | | 5/1997 |

(56) **References Cited**

FOREIGN PATENT DOCUMENTS

| | | |
|---|---|---|
| WO | WO-9730551 | 8/1997 |
| WO | WO-97/41504 | 11/1997 |
| WO | WO-9741504 | 11/1997 |
| WO | WO-97/44942 | 12/1997 |
| WO | 9844733 A1 | 10/1998 |
| WO | WO-9847733 | 10/1998 |
| WO | WO-9849634 | 11/1998 |
| WO | WO-9922477 | 5/1999 |
| WO | WO-0020974 | 4/2000 |
| WO | WO-0022795 | 4/2000 |
| WO | WO-0138984 | 5/2000 |
| WO | WO-0048100 | 8/2000 |
| WO | WO-0138993 | 5/2001 |
| WO | WO-0180558 | 10/2001 |
| WO | WO-02057943 | 7/2002 |
| WO | WO-03023781 | 3/2003 |
| WO | WO-2004039034 | 5/2004 |
| WO | WO-2005004485 A1 | 1/2005 |

OTHER PUBLICATIONS

IPR2015-01036 Decision Instituting, dated Oct. 23, 2015.
IPR2015-01037 Decision Denying Institution, dated Oct. 19, 2015.
Shae, et al., Large Scale Experiments on Low Bit Rate Multimedia Broadcast, IS&T/SPIE Conference on Visual Communications and Image Processing '99, SPIE vol. 3653, Jan. 1999.
Dwire, Client/Server Computing, McGraw-Hill, Inc., 1993.
IPR2016-01655 Decision Denying Institution, dated Feb. 27, 2017.
IPR2016-01656 Decision Instituting, dated Feb. 27, 2017.
IPR2016-01657 Decision Denying Institution, dated Feb. 27, 2017.
IPR2016-01658 Decision Instituting, dated Feb. 27, 2017.
A. Periyannan; "Delivering Media Generically over RTP"; Mar. 13, 1998.
"Macromedia delivers macromedia flash communication server MX"; Jul. 9, 2002.
Ahmed Bashandy; "Jitter Control and Dynamic Resource Management for Multimedia Communication Over Broadband Network," ECE Technical Reports, Electrical and Computer Engineering; Jun. 1, 1998.
Alan Jones; "Handling Audio and Video Streams in a Distributed Environment"; 1993.
Mark Allman et al.; TCP Congestion Control, Standards Track ; RFC2581; ; Apr. 1999.
Elan Amir et al.; An Application Level Video Gateway, ACM Multimedia 95—Electronic Proceedings; Nov. 1995.
Amitabha Das; "A Model for Synchronisation and Communication of Distributed Multimedia Data Streams," IEEE Catalogue No. 95TH8061; 1995.
Andrew S. Tanenbaum; Computer Networks, Third Edition—Chapter 6; 1996.
Andy Hopper; "Pandora—an experimental system for multimedia applications"; Jan. 1990.
Anup Rao; "Real Time Streaming Protocol," 1996; 1996.
ARRL Amateur Radio; "10th Computer Networking Conference"; Sep. 1991.
ARRL Amateur Radio; "Computer Networking Conference 1-4"; 1981-1985.
ARRL Amateur Radio; "5th Computer Networking Conference"; Mar. 9, 1986.
ARRL Amateur Radio; "6th Computer Networking Conference"; Aug. 29, 1987.
ARRL Amateur Radio; "7th Computer Networking Conference"; Oct. 1, 1988.
ARRL Amateur Radio; "8th Computer Networking Conference"; Oct. 7, 1989.
ARRL/CRRL Amateur Radio; "9th Computer Networking Conference"; Sep. 22, 1990.
Asit Dan; "A Dynamic Policy of Segment Replication for Load-
Berners Lee, " "Hypertext Transfer Protocol 1.0, May 1996.
Bing Zheng and Mohammed Atiquzzaman; "Traffic Management of Multimedia over ATM Networks"; Jan. 1999.
Bing, Zheng; Multimedia Over Highspeed; Networks: Reducing Network; Requirements With Fast Buffer; Fillup; ; 1998.
Bob Breedlove et al.; Web Programming Unleashed.
Boll, Susanne et al.; Intelligent Prefetching and Buffering for Interactive Streaming of MPEG Videos, Ulmer Informatikberichte Nr. May 2000; Apr. 1, 2000.
Brett Atwood; "Video Netcasting is Making Strides Online"; Mar. 2, 1996.
"America Online Chooses VDOLive; Showcasing Internet Video and to be Available to All AOL Members" Bloomberg Law; Mar. 13, 1997.
C. Zhu; "RTP Payload Format for H. 263 Video Stream," Standards Track, RFC2190; Sep. 1997.
Chen, Zhigang et al.; Real Time Video and Audio in the World Wide Web, World Wide Web Journal; 1995.
Christophe Diot and Inria Sophia Antipolis; "Adaptive Applications and QoS Guaranties," Proc. of the International Conference on Multimedia and Networking; 1995.
Christopher Hess; "Media Streaming Protocol : An Adaptive Protocol for the Delivery of Audio and Video Over the Internet"; 1998.
Christopher Yavelow; Music & Sound Bible, IDG Books Worldwide, Inc.
Chung-Ming Huang and Ruey-Yang Lee; "Multimedia Synchronization for Live Presentation Using the N-Buffer Approach"; 1995.
Chung-Ming Huang et al.; "PARK: A Paused-and-Run K-Stream Multimedia Synchronization Control Scheme"; Apr. 2000.
D. Hoffman et al.; "RTP Payload for MPEG1/MPEG2 Video," Standards Track, RFC 2250; Jan. 1998.
Dan Frankowski and John Riedl; "Hiding Jitter in an Audio Stream"; Jun. 18, 1993.
Jehan-Francois Paris et al.; "A Hybrid Broadcasting Protocol for Video on Demand"; 1999.
Jehan-Francois Paris and Darrell D.E. Long; "A Proactive Implementation of Interactive Video-on-Demand"; 2003.
Jehan-Francois Paris et al.; "A Reactive Broadcasting Protocol for Video on Demand"; 1999.
Jehan-Francois Paris et al.; "A Zero-delay Broadcasting Protocol for Video on Demand"; 1999.
Chane L. Fullmer et al.; "Adding Adaptive Flow Control to Swift/RAID"; Jan. 12, 1995.
Jehan-Francois Paris et al.; "Combining Pay-Per-View and Video-on-Demand Services"; 1999.
Jehan-Francois Paris et al.; "Efficient Broadcasting Protocols for Video on Demand"; 1998.
Luis-Felipe Cabrera; "Exploiting Multiple I/O Streams to Provide High Data-Rates"; 1991.
Steven W. Carter and Darrell D.E. Long; "Improving Bandwidth Efficency of Video-on-Demand Servers"; 1999.
Steven W. Carter and Darrell D.E. Long; "Improving Video-on-Demand Server Efficiency Through Stream Tapping"; 1997.
Cheng Tang et al.; "Performance Guarantees on ATM Networks"; 1994.
Darrell D.E. Long et al.; "Providing Performance Guarantees in an FDDI Network"; 1993.
Darrell D.E. Long and Madhukar N. Thakur; "Scheduling Real-Time Disk Transfers for Continuous Media Applications"; 1993.
Luis-Felipe Cabrera and Darrell D.E. Long; "Swift: A Distributed Storage Architecture for Large Objects"; 1991.
Karthik Thirumalai et al.; "Tabbycat—an Inexpensive Scalable Server for Video-on-Demand"; 2003.
David Greaves and Mark Taunton; "ATM for Video and Audio on Demand," AES UK Audio for New Media Conference, UK 11th Conference: Audio for New Media (ANM); Mar. 1996.
David P. Anderson and George Homsy; "A Continuous Media I/O Server and Its Synchronization Mechanism," University of California at Berkeley, pub. IEEE 1991; Oct. 1991.

DOCKET ALARM

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

**LAW FIRMS**
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

**FINANCIAL INSTITUTIONS**
Litigation and bankruptcy checks for companies and debtors.

**E-DISCOVERY AND LEGAL VENDORS**
Sync your system to PACER to automate legal marketing.